



Benefits and Opportunities of Implementing Electronic Medical Records: A Literature Review

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ABSTRACT: Electronic medical records (EMR) are one of the innovations in the shift of the healthcare system towards the utilization of information technology. EMR offers various opportunities and benefits, both for healthcare providers and patients. This study aims to identify the benefits and opportunities of implementing EMR. The research method used a literature review, selecting articles using the Google Scholar, PubMed, and Science Direct databases with inclusion criteria including articles in the form of studies with qualitative or quantitative approaches, in Indonesian or English, full-text, and published within the period of 2016 – 2024. A total of 50 articles were obtained, of which 10 articles were included in the discussion. The research results show that the benefits of electronic medical records include increased data accessibility and information accuracy; work efficiency; improved communication and coordination of patient-centered care; reduced medical errors; support for evidence-based practices; enhanced financial performance; reduced patient wait times; increased patient satisfaction; support for clinical research; the ability to provide real-time insights into health trends; and improved accuracy in disease surveillance reporting. The conclusion of this paper is that EHRs provide significant opportunities and benefits, making it important for all parties to collaborate in implementing EHRs effectively and efficiently to improve the quality of healthcare services.

KEYWORDS: Electronic medical records, EMR opportunities, EMR benefits, Literature review.

INTRODUCTION

In the current digital era, healthcare systems worldwide are undergoing significant transformations, one of which is through the implementation of Electronic Medical Records (EMR). EMR is a system used to store, manage, and share patient health information in digital format. The implementation of EMR can improve the quality of patient care and overall health outcomes (Adeniyi et al., 2024). The benefits of EMR are not limited to data management, but also encompass economic, clinical, and improved clinical information aspects in hospitals. With the adoption of EMR, it is expected that the quality of healthcare services can improve, operational efficiency can be achieved, and costs can be reduced (Ariyanti et al., 2023). In addition, EMR is capable of improving efficiency in managing patient information. With an integrated system, doctors and other medical staff can quickly access patients' health histories, lab results, and other medical records without having to search for physical documents. This not only saves time but also reduces the risk of medical errors that can occur due to incomplete or missing information (El-Yafouri et al., 2023).

EMR is a system that contributes to the improvement of healthcare service quality by reducing wait times, thereby increasing patient satisfaction. With complete and accurate data, doctors can make better decisions regarding diagnosis and treatment. The use of EMR improves coordination between doctors and specialists, thereby speeding up the patient care process (Uslu & Stausberg, 2021). Statistics show that hospitals that adopt EMR experience a 20% reduction in patient wait times (Kruse et al., 2018). This is a tangible indicator of the efficiency generated by this system. Another study notes that hospitals that have implemented EMR experienced a reduction in wait times by up to 30%, which ultimately will increase patient satisfaction (Fennelly et al., 2020). Data shows that hospitals implementing EMR can increase patient satisfaction by up to 30% (Kavuma & Mars, 2022).



In terms of security, EMR offers better protection for patient data. With a digital system, medical data can be encrypted and protected by various layers of security, reducing the risk of data loss or unauthorized access. One of the challenges faced in the implementation of EMR is the concern regarding data privacy and security. However, with continuously evolving technology, many EMR systems are now equipped with advanced security features, thereby increasing patient trust in the use of EMR (Kavandi et al., 2024).

The implementation of EMR opens up various new opportunities in the healthcare world. One of them is the ability to perform big data analysis to support population health. With integrated data, hospitals can conduct in-depth analyses to identify health trends in the community. This is crucial in responding to disease outbreaks or in designing disease prevention programs (Miotto et al., 2016). shows that EMR can help in identifying trends in children's mental health conditions in a timely manner, allowing for faster and more effective interventions (Elia et al., 2023). Another opportunity that arises is the use of artificial intelligence (AI) technology in health data analysis. AI can help predict disease risks based on the patient's health history stored in the EHR. For example, AI-based systems can predict the likelihood of complications in diabetes patients with high accuracy. This not only improves patient health outcomes but also reduces long-term care costs (Miotto et al., 2016).

Furthermore, EMR also allows telemedicine to thrive. In situations like the COVID-19 pandemic, many patients are unable to visit hospitals in person. With the presence of EMR, doctors can conduct remote consultations and still have access to patients' health records. This shows that EMR is not just a tool for storing data, but also a foundation for future healthcare service innovations (Lederman et al., 2024). In a global context, the adoption of EMR provides opportunities for international collaboration in health research. Studies note that the use of EMR allows for better exchange of health information between countries, which can help in addressing infectious diseases and other global health issues. By sharing data and experiences, countries can learn from each other and develop more effective strategies to improve the health of their populations (Shah & Khan, 2020).

The increasing need for accurate and easily accessible health data makes the implementation of EHRs important both globally and in Indonesia. World Health Organization (2016) shows that there has been a consistent increase in the integration of electronic medical records over the past 15 years—culminating in a 46% surge on a global scale in the last five years. More than 50% of countries classified as upper-middle and high-income (n=23) have successfully implemented national electronic medical records. Conversely, the adoption rate significantly decreases in lower-middle-income countries (35%; n = 10) and low-income countries (15%; n = 3). Most member countries with a national electronic medical record system reported successful integration of electronic medical records with laboratory systems (77%; n = 44) and pharmacy information systems (72%; n = 41), followed by picture archiving and communication systems (PACS) (56%; n = 32) (WHO, 2016).

In Indonesia, the Ministry of Health encourages all healthcare facilities to switch to the EHR system. This is part of the effort to improve healthcare services (Ikawati, 2024). Since the issuance of the Minister of Health Regulation No. 24 of 2014 concerning Medical Records, Indonesia has begun to regulate and encourage the use of Electronic Medical Records (EMR) in various healthcare facilities. This is a progressive step towards achieving efficiency in managing patient health information, accelerating data access, and improving coordination among healthcare facilities. A survey conducted by the Indonesian Hospital Association (PERSI) in March 2022 found that out of 3,000 hospitals in Indonesia, 50% have implemented the EMR system. The large number of hospitals that have not yet implemented EMR encourages researchers to explore in more depth the benefits and opportunities offered by EMR. This is one of the efforts to encourage healthcare facilities, especially hospitals, to promptly implement EMR. The purpose of writing this article is to understand the various benefits and opportunities offered by the implementation of EMR using the literature review method.

METHODS

The research method in this article is using a literature review, with the following stages: determination of the writing topic, determination of the scope, exploration of articles, and selection of articles using the Google Scholar, PubMed, and Science Direct databases with inclusion criteria including articles in the form of studies using qualitative or quantitative approaches, written in Indonesian or English, full-text, and published in the period from 2016 to 2024. The keywords used in the article search were "electronic medical records," "benefits of electronic medical records," and "opportunities of electronic medical records." Based on the search results, 50 articles were obtained, of which 10 articles were included in the discussion. The inclusion criteria were materials that matched the keywords, and the exclusion criteria were journals that were review articles..

RESULTS

The implementation of electronic medical records provides many benefits and opportunities. Based on a literature review of 10 articles obtained through searches using the keywords electronic medical records, benefits of electronic medical records, and opportunities of electronic medical records, it was found that several articles mention the benefits of electronic medical records, including improved data accessibility and information accuracy, work efficiency, enhanced communication and care coordination, patient-centered care, and reduced medical errors. EMR supports evidence-based practice. EMR also leads to improved financial performance. Additionally, EMR is capable of reducing patient wait times, enhancing patient satisfaction, and supporting clinical research. EMR can also provide real-time insights into emerging mental health trends. The complete results of the literature review can be seen in Table 1.

Table 1. Article Synthesis Results

No	Title	Author	Objective	Methods	Results
1	The impact of electronic health records on patient care and outcomes: A comprehensive review	Adeniyi et al (2024)	Providing a comprehensive overview of the role of electronic health records (EHR) in modern healthcare and its impact on patient care and outcomes	Comprehensive review	EHR improves the accessibility and accuracy of patient information, leading to better decision-making; EHR facilitates communication among healthcare providers, enhancing care coordination and reducing medical errors; and EHR supports evidence-based practices, aiding in preventive care and timely interventions.
2	Electronic health records identify timely trends in childhood mental health conditions	Elia et al (2023)	To assess the translation of EHR data by developing a typology of pediatric mental health conditions and enhancing the understanding of mental health conditions through the aggregation of EHR data	Cohort study, comprehensive EHR-based typology	EHR data can provide real-time insights into emerging mental health trends, assisting pediatric health systems; it can enhance suicide detection and identify unrecognized conditions, improving overall mental health care.
3	Benefits, facilitators, and barriers of electronic medical records implementation in outpatient settings: A scoping review	Kavandi et al (2024)	Evaluating the breadth and depth of evidence regarding the benefits of EMR implementation in outpatient services	This paper conducts a coverage review following the PRISMA extension.	Direct benefits include improved communication, work efficiency, and patient-centered care; while indirect benefits encompass enhanced financial performance and increased data accessibility.
4	Electronic health record population health management for chronic kidney disease care: a cluster randomized clinical trial	Jhamb et al (2024)	Comparing the effectiveness of electronic health record-based interventions with usual care to reduce the progression of chronic kidney disease (CKD) and to enhance evidence-based care for high-risk CKD patients	Pragmatic cluster randomized clinical trial design conducted in 101 primary care practices.	Randomized clinical trials show that electronic health records and population health management strategies can overcome many implementation barriers in delivering evidence-based services, although they do not reduce the progression of CKD.



No	Title	Author	Objective	Methods	Results
5	Adverse inpatient outcomes during the transition to a new electronic health record system: Observational study	Barnett et al (2016)	Assessing the short-term relationship between EHR implementation and patient outcomes such as mortality and focusing on evaluating adverse safety events related to EHR implementation in inpatient settings	Observational design with difference-in-differences analysis to assess the impact of EHR implementation on patient outcomes	The implementation of electronic health records (EHR) does not show an overall negative relationship with short-term inpatient mortality, adverse events, or readmissions at several hospital locations.
6	Electronic health records to facilitate clinical research	Cowie et al (2017)	Utilizing electronic health records (EHR) for observational research and comparative effectiveness; assessing study feasibility and facilitating patient recruitment using EHR; and discuss the challenges in data security, privacy, and system integration for the use of EHR in clinical research	Observational studies, pragmatic trials, and comparative effectiveness studies.	Electronic health records (EHR) have significant potential to enhance clinical research by improving patient recruitment, streamlining data collection, and assessing study feasibility.
7	The effect of an integrated electronic medical record system on malaria out-patient case management in a Ugandan health facility	Kavuma and Mars (2022)	evaluating the impact of implementing an integrated electronic medical record system on malaria case management for outpatient patients in Uganda; improving clinician workflow efficiency and patient care quality through the use of electronic medical records; and improving the accuracy of malaria surveillance reporting at intervention sites.	A comparative pilot study was conducted in Uganda over 12 months involving an intervention group and a control group.	The Electronic Medical Record (EMR) system significantly improves the management of malaria cases in outpatient patients by reducing the duration of visits; increasing the availability of patient age and weight information for clinicians, which is crucial in prescribing anti-malaria medication; The accuracy of malaria surveillance reporting has also improved at intervention sites using the EMR system.
8	The role of electronic medical records in improving health care quality A quasi-experimental study	Ibrahim et al (2022)	Comparing patient satisfaction between clinics that use Electronic Medical Record (EMR) systems and clinics that still use paper-based recording; and evaluating the performance of healthcare services after the implementation of the EMR system.	Quasi-experimental design with a control group to compare patient satisfaction between clinics using Electronic Medical Record (EMR) systems and paper-based clinics.	The average satisfaction score for the communication aspect is higher in EMR-based clinics (4.08) compared to paper-based clinics (3.96); this study concludes that the implementation of EMR improves patient satisfaction and the quality of communication in healthcare service delivery.



No	Title	Author	Objective	Methods	Results
9	The Effect of EMR implementation on Regular Outpatient Waiting Times at Hermina Hospital Solo	Rachmawati et al (2023)	Identifying the impact of electronic medical record implementation on outpatient clinic waiting times, specifically on waiting time, doctor examination waiting time, and pharmacy waiting time.	Quantitative with an observational analytic design, using a retrospective cohort approach with a t-test.	Total waiting time after the implementation of EMR is better compared to before; From the results of the t-test statistical analysis, a significant effect of EMR on waiting time was obtained.
10	Implementation of electronic medical records with clinical decision support system	Erawantini and Wibowo (2019)	Implementing the EMR application in the education clinic and evaluating user satisfaction with the implemented EMR application	Parallel implementation and evaluation of user satisfaction using the end user computing satisfaction method.	The EMR application can be implemented in educational clinics, with clinical decision support including blood pressure determination, Diabetes mellitus risk assessment, stroke risk assessment, drug interaction with allergy history, and abnormal alerts for laboratory and radiology test results.

DISCUSSION

EMR have become one of the important innovations that enable faster and more accurate access to medical information. EMR not only changes the way medical information is stored and managed, but also plays an important role in better clinical decision-making. One of the main advantages of EHR is its ability to provide medical information in real-time. EMR provides easy access to information for medical personnel. With EMR, doctors can quickly access patients' health histories, laboratory test results, and previous medical records in just seconds. This is crucial in emergency situations where every second is invaluable. For example, in the case of a heart attack, quick access to the patient's medical history can help doctors determine the appropriate steps to save the patient's life (Cowie et al., 2017). Additionally, data shows that hospitals implementing EMR have faster response times in handling emergency cases (Adeniyi et al., 2024). EMR also improves the accuracy of information available for clinical decision-making. In a systematic review of the benefits and barriers to EMR implementation in outpatient settings, it was found that EMR reduces the likelihood of medical errors caused by incomplete or inaccurate information. With an integrated system, doctors can view the latest and relevant information about patients without having to search in various places (Kavandi et al., 2024). A concrete example can be seen from the study conducted by Elia et al. (2023), which shows that EMR can identify trends in children's mental health conditions in a timely manner, allowing for quicker and more effective interventions (Elia et al., 2023).

EMR also supports collaboration among medical professionals. With the presence of a connected system, specialists, nurses, and other healthcare professionals can share information more easily. This allows medical teams to collaborate in formulating better diagnoses and treatment plans. Fennelly et al. (2020) in their study on the national implementation of EMR noted that better collaboration among health disciplines can improve the quality of patient care. For example, in the case of patients with chronic conditions requiring care from various specialists, EMR allows all parties involved to have equal access to relevant information, thereby minimizing the risk of errors and improving care outcomes (Fennelly et al., 2020). One factor by which EMR can enhance patient satisfaction is the ease of access to medical information. EMR allows doctors and other healthcare professionals to quickly access patients' medical histories, laboratory results, and other important data. According to Cowie et al. (2017), the use of EHR in clinical practice allows doctors to conduct clinical research more efficiently, thereby improving the quality of care for patients. Accurate and up-to-date data enable medical professionals to make better and faster decisions, so patients do not have to wait long to receive the correct diagnosis and treatment (Cowie et al., 2017).

EMR also contributes to the reduction of medical errors. A study found that the use of EMR significantly reduces the rate of errors in treatment and diagnosis. This is important because medical errors are one of the factors that can decrease patient



satisfaction. By reducing the likelihood of errors, patients feel safer and more satisfied with the services they receive. For example, a hospital in Jakarta that implemented EMR reported a 30% reduction in medical error incidents after the EMR system was implemented, which positively impacted patient satisfaction levels (Adeniyi et al., 2024). EMR is capable of improving communication between patients and healthcare providers. Several cases found indicate that patients feel dissatisfied due to a lack of information regarding their health conditions. Through EMR, patients can access their own medical records, including examination results and treatment plans, through the patient portal. This shows that patients are involved in their care process. A study shows that 75% of patients using the EMR portal report feeling more involved in their care and more satisfied with the communication they receive from medical staff (Kavandi et al., 2024).

EMR not only serves as a data storage tool but also as a means to enhance the efficiency of doctors' workflows and manage patient loads more effectively. Through the implementation of EMR, various studies have shown improvements in aspects of healthcare services, a reduction in patient wait times, and an increase in the accuracy of diagnosis and treatment. EMR allows doctors to access patient data quickly and easily, thereby speeding up the medical decision-making process. A study found that the use of EMR in outpatient services can save up to 30% of time in managing patient data. This is very important considering the increasing workload of doctors, especially in hospitals that serve many patients (Kavandi et al., 2024). Additionally, EMR also contributes to the more effective management of patient load. Adeniyi et al. (2020) noted that the use of EMR can improve coordination among various healthcare providers. With better access to patients' medical histories, doctors can make more accurate and quicker decisions, which positively impacts patient care outcomes. For example, in a hospital in Nigeria, the implementation of EHR has reduced medication errors by 40%, demonstrating the importance of this system in improving patient safety (Adeniyi et al., 2024). Another success story can be seen in the implementation of EHR in Ireland, where Fennelly et al. (2020) reported that the nationwide adoption of electronic health records has reduced waiting times for emergency care by up to 25%. With an integrated system, doctors can easily share information with their colleagues, enabling faster and more efficient patient handling. This is crucial in emergency situations where every second is valuable (Fennelly et al., 2020).

Another opportunity offered by EMR is the ability to conduct research and analyze health data more effectively. EMR allows the collected health data to be used for epidemiological research and public health studies. Studies note that EMR can support research by providing accurate and up-to-date data on the health conditions of the population (Fennelly et al., 2020). For example, research conducted by Elia et al. (2023) shows that EMR can identify mental health trends in children more quickly, allowing for earlier interventions. Through the analysis of data stored in EMR, researchers can identify increases in cases of anxiety and depression among children more quickly compared to traditional methods. This shows that EMR is not only beneficial for individual care but also for overall public health planning (Elia et al., 2023).

The adoption of EMR also provides opportunities for international collaboration in health research. Shah and Khan (2020) noted that the use of EMR allows for better exchange of health information between countries, which can help in addressing infectious diseases and other global health issues. By sharing data and experiences, countries can learn from each other and develop more effective strategies to improve the health of their populations (Shah & Khan, 2020).

CONCLUSION

The conclusion of this study includes that the EMR system has great potential to improve service delivery efficiency and enhance the clinical decision-making process through faster and more accurate information access. EMR can accelerate information access, improve the quality of care, and enable better data analysis. EMR has proven to be a highly valuable tool in improving the efficiency of doctors' workflows and managing patient loads more effectively. By utilizing this technology, medical staff can provide better and more timely care to patients. Therefore, it is important for all parties to collaborate in implementing EMR effectively and efficiently to improve the quality of healthcare services.

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